Perimeter Air Monitoring Program for the Passaic River Phase I Removal Action

Purpose:

To develop an air monitoring program that protects the populace living and working on a permanent basis external to the perimeter of the proposed project from adverse health effects due to inhalation of project associated contaminants.

Conceptual Approach:

Health based Alert Levels for the designated receptors (residential and nonresidential exposure scenarios) will be established for the contaminants of concern. Because of the non-chronic duration of the project, the preferential choice will be the inhalation reference concentration (RfC). An inhalation unit risk value (URI) will be employed only when an RfC is not available, The URI, a chronic carcinogenic based value, will be adjusted for the non-chronic duration and the appropriate exposure scenario.

A conceptual site model will be employed to aid in designing the monitoring program as well as to help evaluate the collected data. Analysis of expected levels using current standardized air models will be one aspect of this. Measurement of the actual concentrations of the selected contaminants of concern via standard certified laboratory analytical methods will verify the conceptual site model and more importantly document the actual conditions at the chosen receptor locations. Measurements will initially be done continuously, but may be modified based on the results observed.

The goal is to select analytical methods which can achieve detection of the established health based values. Alternatively, practical quantitation limits (PQL) may need to be employed if this can not be accomplished. Another goal is the establishment of responses or corrective actions when critical values and conditions are exceeded. In making the determination that an exceedance of an Alert Level has occurred background and/or upwind conditions will also be considered. Modifications of the proposed corrective actions are also subject to approval by the US Environmental Protection Agency (USEPA)/New Jersey Department of Environmental Protection (Department).

Odor will be the initial basis to address non-discharge compounds such as hydrogen sulfide. Because the perimeter air monitoring is focused on health based values and after discussions with the USEPA, The Agency for Toxic Substances and Disease Registry (ATSDR) minimal risk level (MRL) for hydrogen sulfide will be employed as a basis for corrective action once an odor complaint is received.

It is expected that best management practices will be employed. Preventing visible dust emissions will allow the deletion of particulate monitoring (PM10 or PM2.5). Note the expectation that the material will be wet or damp which would then decrease the potential for particle dispersion is also part of this decision. Taking maximum operational

advantage of wind directions away from receptors will aid in reducing receptor exposures. Consideration of the effect that wind speed has and adjusting properly is another best management practice. Finally, consideration of the contaminant levels being processed needs to be done. Handling of highly concentrated material may require reducing the rate of sediment processing or other steps that result in a reduction of emissions until data are obtained that justify a return to higher processing rates.

This conceptual approach provided is site-specific for the Passaic River Phase 1 Removal Action. The approach described embodies the Department's current thinking on perimeter air monitoring, but the Department reserves the right to modify in the future the approach to reflect different conditions and priorities as well as new experiences and knowledge.

Contaminants of Concern to be Monitored:

The following Contaminants of Concern will be monitored: Dioxins/Furans (expressed as 2,3,7,8-tetrachlorodibenzo-p-dioxin TEQ), Total PCBs, Chlorobenzene, and DDT.

These contaminants will serve as indicators for all other discharged contaminants present. If data are obtained that justify it, the contaminant suite may be either increased or decreased with prior approval of the oversight agencies.

While not a discharged contaminant, hydrogen sulfide may become an issue due to the removal and processing of the contaminated sediments. As such, measurement of hydrogen sulfide may be added to the monitoring program, if necessary.

Sampling Requirements:

Establish an onsite weather station to collect, at a minimum, continuous information on air temperature, wind speed, wind direction, barometric pressure, and precipitation for all days of operation. This information is to be electronically logged on a continuous basis.

The two locations that are the focus of the monitoring are the Phase 1 Area (P1A) and the Upland Processing Facility (UPF).

Prior to initiating dredging work, establish background conditions by setting up and operating the designated monitoring stations to collect samples for laboratory analysis for the primary contaminants of concern listed above. The weather data concurrent with this sampling is to be collected as well. The suggested duration is two 24 hour periods without precipitation or atypical winds.

Samples for laboratory analysis of the primary contaminants of concern are to be collected at each monitoring station. The sampling is to be continuous for all days of operation unless otherwise approved by the USEPA/Department. The frequency of

measurement will be reviewed on a weekly basis to determine, after consultation with the USEPA and the Department, if changes are warranted.

It is recognized that contaminant distribution is variable. When processing higher contaminant concentrations for the first time, rigorous sampling is to be employed to ensure the public health is protected and to establish an expectation of contaminant emissions for future work.

Analysis Requirements:

In accordance with SOP No.6 Ambient Air Sampling, July 2011, of the Phase I Removal Action RAWP, samples for laboratory analysis shall be collected using the following methods:

Dioxins/Furans – USEPA T0-9A
PCBs/Pesticides. – USEPA T0-4A
Chlorobenzene – USEPA T0-15

Collect 24-hour samples for the above analyses on a daily basis from each monitoring station.

Initially, until a data base is established, laboratory analysis is to be done on an expedited basis, a turn-around time of 48 - 72 hours is required. Once a sufficient baseline and/or knowledge of emissions have been established, the USEPA/ Department may exercise the option to relax the laboratory analytical turn-around time. If the measured results merit it, increased turn-around time and reduced frequency should be considered assuming the emissions are expected to be relatively unchanged as a result of similar contaminant levels being encountered and similar work practices being in place. One exception is if sediments having higher contaminant concentrations are being dredged and/or processed for the first time. In those cases, it will be prudent to have the results sooner to properly assess the impact while minimizing the exposure to the receptors beyond the perimeter.

If hydrogen sulfide becomes an issue, the Jerome 631-XE, a portable meter capable of detecting down to approximately 4 micrograms of hydrogen sulfide per cubic meter, is recommended to collect data. While not a laboratory certified method, this instrument will provide real time response and flexibility in use.

Monitoring Stations:

The intent is to establish, at both the P1A and UPF and to the extent feasible, a network of monitoring stations oriented in all directions with the aim of protecting the nearest receptors.

Analysis of wind rose data indicates that winds from the west are expected to

predominate, but the direction does vary. Aerial photographic analysis indicates residential sites are of limited distribution in the vicinity; are largely cross wind to the prevailing winds; and are relatively distant from the P1A and UPF. This reduces the number of residential receptors that need to be monitored. Nevertheless, a selection of the nearest residential receptors will be monitored to document that human health has been protected.

A major complication to the perimeter air monitoring is the presence of nonresidential sites immediately outside the fence line. In fact, a facility (Benjamin Moore) is believed to be operational and is directly between both the P1A and UPF. The proximity of these facilities minimizes the attenuation of the contaminants that would result from dilution over distance and means that the nonresidential health based values will be largely applied at the borders of the P1A and UPF.

The initial selection of monitoring stations is indicated in Figure 1. There are 7 nonresidential (or fence line) stations (yellow triangle), 2 residential stations (blue star), and 4 potential residential stations (magenta circle) that could be used if the primary residential stations are not available for sampling. The residential stations were selected to provide directional coverage as well as proximity. The selection of the nonresidential sites is more complicated. The concerns include:

1. Protect/document the nearest nonresidential receptors
2. Provide upwind and downwind orientations for a number of wind directions.
3. Be able to assess any discharge of the contaminant suite of interest for this project emanating from the Benjamin Moore facility which is located between the P1A and UPF.
4. Minimize information gathering to the north because there are no nearby receptors present

Preliminary analysis suggests dioxin will be the primary concern. If the observed data confirms this and the levels are below levels of concern, reduction or elimination of the testing of other contaminants may be possible. However, this assumes these data are not needed for the interpretation of other data.

Reporting Requirements:

Daily records are to be kept in an onsite air monitoring log and are to be available for inspection. Weekly summaries of the ambient air monitoring results are to be prepared and submitted to USEPA and Department in a timely manner. Exceedance of an Alert Level requires notification of the Project Manager at both the USEPA and the Department as per the Contingency Action section of this document. For other specific requirements, beyond reporting, the Corrective Action Tables in the Contingency Action section describes these as well

Health Based Values for Contaminants of Concern and Alert Levels:

Chlorobenzene: The RfC of 1,000 micrograms per cubic meter (ug/m3) used by the Technology Transfer Network Air Toxic Website (4/27/2010); the Division of Air Quality RfC List; and the California Office of Environmental Health Hazard Assessment.

DDT: The residential exposure scenario value of 2.93 ug/m3 calculated for a 90 day period using the inhalation unit risk established by the Integrated Risk Information System (IRIS) of 9.7 E-05 per ug/m3 since there was no RfC data available. The comparable nonresidential exposure scenario value would be 8.78 ug/m3.

Dioxin: The RfC of 4.0 E-05 ug/m3 established by the California Office of Environmental Health Hazard Assessment.

PCB: The residential exposure scenario value of 2.84 ug/m3 calculated for a 90 day period using the inhalation unit risk established by the Technology Transfer Network Air Toxics Website (4/27/2010) of 1.0 E-04 per ug/m3 since there was no RfC data available. The comparable nonresidential exposure scenario value would be 8.52 ug/m3.

Because of the proximity of nonresidential receptors offsite to the P1A and UPF, the nonresidential PCBs and DDT values will apply to all monitoring stations close to the P1A and the UPF. For PCBs and DDT, corresponding residential exposure scenario values will apply at the monitoring stations at the residential sites. RfCs for the other discharged contaminants will apply to both the nonresidential and residential monitoring stations. The RfC will not be modified to reflect a nonresidential exposure scenario.

Hydrogen Sulfide : The ATSDR MRL of 28 ug/m3 for intermediate duration exposure to hydrogen sulfide will be employed, if needed, to address an initial odor complaint at any location irrespective of exposure scenario. The basis of the ATSDR MRL is compatible with the expected exposure resulting from the proposed work. In addition, the ATSDR MRLs are accepted and well established values. This particular MRL falls within the central range of the other potential hydrogen sulfide criteria.

Contingency Actions: (describe process/steps to rectify the exceedance situation)

Evaluation of all laboratory results for contaminant concerns is to be done on a daily basis. Consideration of prevailing weather conditions is to be incorporated into this evaluation. Adjustments for background levels from the baseline study or the upwind condition are also part of this analysis. The relevant upwind or background concentrations may be deducted from the observed reading at a downwind monitoring station. If this corrected amount is greater than the appropriate Alert Level it is categorized an exceedance of the Alert Level. Any new or additional actions taken to reduce emissions because of requirements triggered by the corrected concentration are to be documented as well.

Tables of specific corrective actions for each contaminant follow. Note that a table has also been included for hydrogen sulfide in the event it becomes problematic:

Corrective Action for Dioxin for All Types of Monitoring Stations

Action Level	Concentration Levels	Required Action	Reporting/Notification
Typical Operations Level	24 hr Dioxin less than or equal to 80% of the Alert Level after subtracting out upwind or background levels • Less or equal to than $3.2x10^{-5}$ µg/m^3 for 24 hr samples	• Continue with existing controls • Monitoring with 48-72 hr laboratory turn-around	• Weekly reporting of monitoring data to USEPA/Department
Concern Level	24 hr Dioxin within 20% of the Alert Level, after subtracting out upwind or background levels • Greater than $3.2x10^{-5}$ µg/m^3 and less than or equal to $4.0x10^{-5}$ µg/m^3 for 24 hr samples	• Identify cause of increased emissions • Implement monitoring to confirm upwind or background levels • Implement mitigation as in the air controls contingency plan	• Notify USEPA/Department within 24 hrs of receipt of analytical results • Weekly report to describe corrective actions
Exceedance Level	24 hr Dioxin exceed Alert Level, after subtracting out upwind or background levels • Greater than $4.0x10^{-5}$ µg/m^3 for 24 hr samples	• Identify cause of exceedance • Establish additional monitoring stations, as needed, including upwind or background, to evaluate the cause of increased emissions • Develop action plan and implement additional mitigation • Continue monitoring to confirm compliance with standard	• Notify USEPA/Department immediately • Provide daily monitoring reports • Within 3 days of discovery of exceedance, provide corrective action report describing causes of exceedance and mitigation implemented.

Stop Work Level	24 hr Dioxin exceed Alert Level, after subtracting out upwind or background levels and averaging for the entire weekly working period • Average is greater than $4.0x10^{-5}$ µg/m^3 for 24 hr samples for 6 days or all the available data for that weekly working period	• Cease operations • Develop action plan and additional mitigation • Obtain USEPA and Department approval prior to restarting operations	• Notify USEPA/Department immediately

Corrective Action Levels for PCBs

Action Level	Concentration Levels	Required Action	Reporting/Notification
Typical Operations Level	24 hr PCBs less than or equal to 80% of the Alert Level after subtracting out upwind or background levels • Residential Areas (2.27 µg/m^3 for 24 hr samples) • Nonresidential Areas (6.82 µg/m^3 for 24 hr samples)	• Continue with existing controls • Monitoring with 48 – 72 hr laboratory turn-around	• Weekly reporting of monitoring data to USEPA/Department
Concern Level	24 hr PCBs within 20% of the Alert Level, after subtracting out upwind or background levels • Residential Areas (greater than 2.27 µg/m^3 and equal to or less than 2.84 µg/m^3 for 24 hr samples) • Nonresidential Areas (greater than 6.82 µg/m^3 and equal to or less than 8.52 µg/m^3 for 24 hr samples)	• Identify cause of increased emissions • Implement monitoring to confirm upwind or background levels • Implement mitigation as in the air controls contingency plan	• Notify USEPA/Department within 24 hrs of receipt of analytical results • Weekly report to describe corrective actions
Exceedance Level	24 hr PCBs exceed Alert Level, after subtracting out background levels	• Identify cause of exceedance • Establish additional monitoring stations,	• Notify USEPA/Department immediately • Provide daily

	• Residential Areas (greater than2.84 µg/m^3 for 24 hr samples) • Nonresidential Areas (greater than 8.52 µg/m^3 for 24 hr samples)	• as needed, including upwind or background, to evaluate the cause of increased emissions • Develop action plan and implement additional mitigation • Continue monitoring to confirm compliance with standard	• monitoring reports • Within 3 days of discovery of exceedance, provide corrective action report describing causes of exceedance and mitigation implemented.
Stop Work Level	24 hr PCBs exceed Alert Level, after subtracting out upwind or background levels and averaging for the entire weekly working period • Average is greater than 2.84 µg/m^3 for 24 hr samples in residential areas for 6 days or all the available data for that weekly working period • Greater than 8.52 µg/m^3 for 24 hr samples in nonresidential areas for 6 days or all the available data for that weekly working period	• Cease operations • Develop action plan and additional mitigation • Obtain USEPA and Department approval prior to restarting operations	• Notify USEPA/Department immediately

Corrective Action for DDT

Action Level	Concentration Levels	Required Action	Reporting/Notification
Typical Operations Level	24 hr DDT equal to or less than 80% of the Alert Level after subtracting out upwind or background levels • Residential Areas (2.34 µg/m^3 for 24 hr samples) • Nonresidential Areas (7.02 µg/m^3 for 24 hr samples)	• Continue with existing controls • Monitoring with 48 - 72 hr laboratory turn-around	• Weekly reporting of monitoring data to USEPA/Department
Concern Level	24 hr DDT within 20% of the	• Identify cause of	• Notify

	Alert Level, after subtracting out upwind or background levels • Residential Areas (greater than 2.34 µg/m^3 and equal to or less than 2.93 µg/m^3 for 24 hr samples) • Nonresidential Areas (greater than 7.02 µg/m^3 and equal to or less than 8.78 µg/m^3 for 24 hr samples)	• increased emissions • Implement monitoring to confirm upwind or background levels • Implement mitigation as in the air controls contingency plan	• USEPA/Department within 24 hrs of receipt of analytical results • Weekly report to describe corrective actions
Exceedance Level	24 hr DDT exceed Alert Level, after subtracting out upwind or background levels • Residential Areas (greater than2.93 µg/m^3 for 24 hr samples) • Nonresidential Areas (greater than 8.78 µg/m^3 for 24 hr samples)	• Identify cause of exceedance • Establish additional monitoring stations, as needed, including upwind or background, to evaluate the cause of increased emissions • Develop action plan and implement additional mitigation • Continue monitoring to confirm compliance with standard	• Notify USEPA/Department immediately • Provide daily monitoring reports • Within 3 days of discovery of exceedance, provide corrective action report describing causes of exceedance and mitigation implemented.
Stop Work Level	24 hr DDT exceed Alert Level, after subtracting out upwind or background levels and averaging for the entire weekly working period • Average is greater than 2.93 µg/m^3 for 24 hr samples in residential areas for 6 days or all the available data for that weekly working period • Greater than 8.78 µg/m^3 for 24 hr samples in nonresidential areas for 6 days or all the available data for that weekly working period	• Cease operations • Develop action plan and additional mitigation • Obtain USEPA and Department approval prior to restarting operations	• Notify USEPA/Department immediately

Corrective Action for Chlorobenzene for All Monitoring Stations

Action Level	Concentration Levels	Required Action	Reporting/Notification
Typical Operations Level	24 hr Chlorobenzene equal to or less than 80% of the Alert Level after subtracting out upwind or background levels • All areas (800 µg/m^3 for 24 hr samples)	• Continue with existing controls • Monitoring with 48 - 72 hr laboratory turn-around	• Weekly reporting of monitoring data to USEPA/Department
Concern Level	24 hr Chlorobenzene within 20% of the Alert Level, after subtracting out upwind or background levels • All Areas (greater than 800 µg/m^3 and equal or less than 1,000 µg/m^3 for 24 hr samples)	• Identify cause of increased emissions • Implement monitoring to confirm upwind or background levels • Implement mitigation as in the air controls contingency plan	• Notify USEPA/Department within 24 hrs of receipt of analytical results • Weekly report to describe corrective actions
Exceedance Level	24 hr Chlorobenzene exceed Alert Level, after subtracting out upwind or background levels • All Areas (greater than 1,000 µg/m^3 for 24 hr samples)	• Identify cause of exceedance • Establish additional monitoring stations, as needed, including upwind or background, to evaluate the cause of increased emissions • Develop action plan and implement additional mitigation • Continue monitoring to confirm compliance with standard	• Notify USEPA/Department immediately • Provide daily monitoring reports • Within 3 days of discovery of exceedance, provide corrective action report describing causes of exceedance and mitigation implemented.
Stop Work Level	24 hr chlorobenzene exceed Alert Level, after subtracting out upwind or background levels and averaging for the entire weekly working period • Average is greater than 1,000 µg/m^3 for 24 hr samples for 6 days or all the available data for that weekly working period	• Cease operations • Develop action plan and additional mitigation • Obtain USEPA and Department approval prior to restarting operations	• Notify USEPA/Department immediately

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Corrective Action for Hydrogen Sulfide for All Monitoring Stations

Action Level	Concentration Levels	Required Action	Reporting/Notification
Typical Operations Level	• No odor complaints	• Continue with existing controls	Weekly reporting of monitoring data to USEPA/Department
Concern Level	• Odor complaint • Within 20% of the Alert Level for Hydrogen Sulfide, after subtracting out upwind or background levels • All Areas (the average over the 24 hr period is greater than 22 μg/m^3 and equal or less than 28 μg/m^3)	• Identify cause of increased emissions • Implement monitoring to confirm upwind or background levels • Implement mitigation as in the air controls contingency plan	• Notify USEPA/Department within 24 hrs • Weekly report to describe corrective actions
Exceedance Level	24 hr average for Hydrogen Sulfide exceeds Alert Level, after subtracting out upwind or background levels • All Areas (the average for the 24 hr period is greater than 28 μg/m^3)	• Identify cause of exceedance • Establish additional monitoring stations, as needed, including upwind or background, to evaluate the cause of increased emissions • Develop action plan and implement additional mitigation • Continue monitoring to confirm compliance with standard	• Notify USEPA/Department immediately • Provide daily monitoring reports • Within 3 days of discovery of exceedance, provide corrective action report describing causes of exceedance and mitigation implemented.

Stop Work Level	24 hr average for Hydrogen Sulfide exceeds Alert Level, after subtracting out upwind or background levels and averaging for the entire weekly working period • Average is greater than 28 $\mu g/m^3$ for the 6 days (24 hrs averages) in the weekly period or for all the available 24 hrs average data for that weekly working period	• Cease operations • Develop action plan and additional mitigation • Obtain USEPA and Department approval prior to restarting operations	• Notify USEPA/Department immediately